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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,312	06/05/2001	Masumi Oshima	01458.00007	5718

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EXAMINER

AWAI, ALEXANDRA F

ART UNIT	PAPER NUMBER
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3663

DATE MAILED: 06/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/873,312

Applicant(s)

OSHIMA ET AL.

Examiner

Alexandra Awai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/24/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 4 and 5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4 and 5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 4/24/2006 have been fully considered but they are not persuasive. The arguments with regard to the references focus on the issue that prior art allegedly only disclose *identification* rather than *quantification*, and that the two-dimensional matrix is not disclosed or suggested. Firstly, each of the primary references disclose quantification by virtue of recording the intensity of the measured signals, also referred to as the count values. As admitted in the present specification (p. 2), gamma detectors are sensitive to the energy and intensity of the gamma rays that result from neutron activation, the former rendering qualitative information and the latter rendering quantitative information. Every instance that the intensity or count number of the detected gamma rays is mentioned is a clear disclosure of quantification of the interrogated nuclide, as is well known in the neutron activation art. Secondly, it is Applicant's prerogative to redefine the three-dimensional plot (Fig. 2) as a two-dimensional matrix, but doing so does not require the references to disclose a two-dimensional matrix, *per se*. Rather, the references must teach or suggest, in view of commonly available knowledge, the step of plotting the data from a plurality of gamma detectors along three axes.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the

applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The concept of using a three-dimensional plot (i.e., one having three orthogonal axes as shown in Fig. 2) to graphically present three variables is not the sole province of the present applicant. Moreover, the information represented on the three-dimensional "Matrix 5" disclosed by Applicant could easily (and more accurately) be represented on a two dimensional plot as the first and second measured gamma rays are discrete events, and are actually represented twice on the two-dimensional plane best seen in Fig. 3. Note that the 10 peaks shown on "Matrix 5" are actually 5 peaks and their mirror images. Similarly, the inset adjacent to the abscissa (841.6 and 121.8) shown in Fig. 3 possesses the same data as the corresponding section adjacent to the ordinate (121.8 and 841.6). The three-dimensional "Matrix 5" is therefore no more than the superposition of the two-dimensional spectra of both gamma rays. As stated on page 11 of the specification, the "two-dimensional matrix" may be replaced by any suitable equivalents.

The "Matrix 5" conveys both real information (the count data and associated energy) and spurious information (a dependence of  $\gamma_1$  measured by a first detector on  $\gamma_2$  measured by a second detector). Although the energy of emitted gamma rays are characteristic of particular nuclides, and the gamma-rays may result from linked relaxation events, there is no benefit to *comparing* the energy of simultaneous gamma emissions measured by different detectors to each other, as opposed to summing all of the measurements in order to have a larger dataset with which to analyze. If it is determined that a single neutron interaction results in multiple emissions, effort must be made group the multiple emissions in order that the neutron interaction only be interpreted as the detection of a single interrogated radionuclide atom. A skilled artisan

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might as well plot counts vs. energy for the gamma ray measured by the detector array as a whole as in Cole et al. (Figs. 4A and 4B) and regard the 121.8 keV peak as representing the same information as the 841.6 keV peak – i.e., interaction of a neutron with a  $^{152}\text{Eu}$  atom – in the same way that Cole et al. has acknowledged that multiple different peaks all serve to indicate the detection of  $^{104}\text{Mo}$ , which in turn aids in identifying the fissioning nuclide.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). It is not necessary that the motivation to look to Vourvopoulos et al. be found in any of the primary references. The motivation, as stated by the previous examiner, would be that using the teachings of the secondary reference is no more than the use of well-known expedients within the nuclear art. As stated by Applicant, each of the primary references implicitly discloses the value of identifying the interrogated species by concordance with standardized spectra. Vourvopoulos et al. is only referenced as an explicit teaching to this effect. Hence the previous examiner's assertion that the secondary reference teaches that it is old and advantageous to compare or fit the measured spectrum or detector readings to that of a known standard.

***Specification***

2. The disclosure is objected to because no units are given for the resolution values, rendering them indefinite. Appropriate correction is required.

***Claim Objections***

3. Claim 4 is objected to because the term “each” between “concurrently from” and “of the radionuclides” should be changed to “any”. As it is currently set forth, the claim may be interpreted as reciting that gamma-rays from distinct radionuclides are concurrently emitted, rather than the concurrent gamma-rays arising from a single activation event. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 4 and 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. Applicant claims that the two axes of the two-dimensional matrix are used to plot the energies of either of the gamma-rays in the concurrent pair, but then proceeds to claim that the count of each gamma-ray is also plotted “at each position plotted on the matrix.” There must be another axis or some other graphical tool used to plot the counts, and

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so an essential element of the method has been omitted. Furthermore, there is insufficient antecedent basis for the term “position”.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term “radioactivate” is used by the claim to mean “activate” or “excite”, while the accepted meaning is “to make radioactive.” The term is indefinite because the specification does not clearly redefine the term.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over any one of Cole et al., Schultz et al., Horrocks et al. or Gozani et al., and further in view of Vourvopoulos et al. and Shao et al. (5,999,588).

As argued in the previous Office Action, any one of Cole et al., Schultz et al., Horrocks et al. or Gozani et al. explicitly disclose Applicant's claims except for the step of constructing a two-dimensional matrix and the step of comparing the radionuclide peaks with a standard. It is noted that Applicant has not challenged the assertion that "providing", "detecting" and "specifying" steps of the claimed method are anticipated by the cited references, but rather has argued that the "two-dimensional matrix" and the step of quantifying (i.e., the "comparing" step to measure the content) are not taught or suggested by the prior art.

Vourvopoulos et al. show it is old and advantageous in the art to compare or the measured spectrum to a known standard (col. 7, lines 2-67). It would have been obvious to one skilled in the art at the time of invention to modify the method as disclosed by any of the primary references to explicitly include the step of comparing peak data to establish the activity level of a radionuclide, thereby determining the quantity or "content" of each radionuclide in the sample. The motivation to make this modification would be to render the maximum information possible from the measurements that are taken and recorded by the prior art systems. As Applicant admits on page 2 of the specification, this strategy to maximize the value of detected data is entirely conventional.



With regard to the “two-dimensional matrix”, which is in actuality a three-dimensional plot, Shao et al. demonstrate the notoriously well-known fact that skilled artisans commonly utilize three-dimensional plots (col. 12, lines 54-58). Shao et al. is related to the present application by both field of endeavor (detector systems) and problem solving area (improving analysis of data derived from gamma detectors). The computer systems associated with any of the primary references are fully capable of creating such a diagram given any three data vectors. Moreover, it is well known that systems such as MATLAB® and Mathetmatica®, which have been available for decades, can easily be used to produce three-dimensional plots given data concerning three different variables. It would have been obvious to one skilled in the art to use the systems disclosed by the prior art or systems that are otherwise widely known and available to plot the data vectors of three variables (i.e., count number, and energy readings from two different detectors for the present case) on a single plot as disclosed by Shao et al. The motivation to make such a plot would be to facilitate viewing of the measured and recorded data. It is noted that the efficiency or resolution of the disclosed system is improved by the inclusion and configuration of *multiple* detectors (which is old as evidenced by the primary references), hence Applicant’s admission that the “two-dimensional matrix” may be replaced by any suitable equivalents (specification, p. 11).

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexandra Awai whose telephone number is (571) 272-3079.

The examiner can normally be reached on 9:30-6:00 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AA  
June 18, 2006

  
JACK KEITH  
SUPERVISORY PATENT EXAMINER